



(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
21.01.1998 Bulletin 1998/04

(51) Int Cl.⁶: **D21D 5/16**

(21) Application number: **95306698.2**

(22) Date of filing: **22.09.1995**

(54) **A method of making a screen cylinder, and a screen cylinder**

Verfahren zur Herstellung eines Siebzyllinders and damit hergestellter Siebzyllinder

Procédé de fabrication d'un tamis cylindrique et tamis cylindrique ainsi fabriqué

(84) Designated Contracting States:
AT DE FR GB SE

(30) Priority: **27.09.1994 FI 944484**

(43) Date of publication of application:
10.04.1996 Bulletin 1996/15

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(56) References cited:
WO-A-94/23847 **DE-A- 4 224 727**

EP 0 705 936 B1

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Description

The invention relates to a method of making a screen cylinder, in which method mesh wires are arranged next to one another at predetermined intervals and attached in the axial direction of the screen cylinder to provide a cylindrical mesh surface on the inside of ring-shaped supporting rods, and at least some of the supporting rods are surrounded on the outside with supporting rings that support them, (cf. DE-A-4 224 727).

The invention also relates to a screen cylinder for purifying and sorting out a pulp mixture, the screen cylinder comprising mesh wires arranged in the axial direction of the screen cylinder at predetermined intervals to provide a cylindrical mesh surface, the mesh wires being attached to the surrounding supporting rods, and at least some of the supporting rods being surrounded on the outside by a supporting ring, (cf. DE-A-4 224 727).

Screen cylinders are made by attaching parallel mesh wires that provide a mesh surface next to one another in a cylindrical shape at desired intervals. This is usually done by welding or brazing the wires to the supporting rods; this is difficult, and the welding also produces flashes. In addition, the welding produces stress on the perimeters due to different thermal expansion and shrinkage. Another problem is that the screen cylinder requires a supporting structure in which the separate supporting rings are usually welded to the supporting rods to provide a uniform structure. As a result, the varying pressure and mechanical load put stress on the inside of the cage during the use, and the stress, which is distributed over the radially extending area formed by the supporting ring and the mesh wire, may cause the structure to crack. This is particularly evident in a solution where the mesh wires are welded to the supporting rods.

The object of the present invention is to provide a method of making a screen cylinder by which the above problems of stress can be avoided and by which the screen cylinder is easy to implement.

The method of the invention is characterized in that the supporting rings are positioned around the corresponding supporting rods without attaching the supporting ring to the supporting rod, and that the supporting ring, when it is put in place, is tightened around the supporting rod so firmly that it presses the supporting rod in the radial direction of the screen cylinder.

Another object of the invention is to provide a screen cylinder that endures stress better than the prior art solutions and is therefore more reliable.

The screen cylinder of the invention is characterized in that the supporting ring is positioned around the corresponding supporting rod without fastening it to the supporting rod, and that the supporting ring, when it is put in place, is tightened around the supporting rod so firmly that it presses the supporting rod in the radial direction of the screen cylinder.

An essential idea of the invention is that the sup-

porting rings and the supporting rods of the screen cylinder are arranged to be separate from one another such that the supporting ring is pressed around the supporting rod, whereby the supporting ring presses the supporting rod inwardly from its outer surface, thereby producing more compression stress than tensile load to the supporting rod. Another essential idea is that the supporting ring is not in any way fastened to the supporting rod, but is only pressed against the outer surface of the supporting rod. The essential idea of one preferred embodiment of the invention is that grooves are provided in the supporting rod at predetermined intervals, the mesh wires being arranged therein without welding them to the supporting rod, and the supporting rod being compressed with a supporting ring such that it presses the mesh wires in its grooves, whereby they are held firmly in position.

An advantage of the invention is that a screen cylinder produced by this method is easy to implement, since it is easy to attach the mesh wires to the thin supporting rod and to bend the supporting rod to the desired form. Another advantage is that once the supporting ring has been compressed and attached, it can be machined and welded on its outer surface to eliminate any holes that enhance cracking and to thereby make its strength and load-enduring capacity as good as possible.

The invention will be described in greater detail in the attached drawing, in which

fig. 1 is a schematic cross-sectional view of a screen cylinder according to the invention, seen in the axial direction,

fig. 2 is a schematic view of an axial section of a screen cylinder according to the invention, and

fig. 3 is a schematic view of one embodiment for attaching the mesh wires and supporting rods to one another.

Fig. 1 is a schematic cross-sectional view of a screen cylinder according to the invention, seen in the axial direction. On the inner surface of a screen cylinder 1, there are mesh wires 2 in the figure around the entire inner perimeter of the screen cylinder 1 to provide a mesh surface. Between the mesh wires 2 there are apertures through which the liquid and the fibres of the type desired are able to pass, whereas sticks, too large fibres and fibre lumps remain on the inner surface of the screen cylinder and are then discharged therefrom through the other end. The mesh wires 2 are attached to supporting rods 3, which are arranged in the shape of a ring to provide a screen cylinder of a suitable size. The supporting rods 3 are arranged in the axial direction of the screen cylinder at suitable intervals such that the mesh wires 2 are held in position in a sufficiently rigid and tight manner. A supporting ring 4 is positioned around the supporting rod 3, the ring supporting the supporting rod 3 and receiving the forces caused by the pressure difference resulting from different varying

pressures on different sides of the mesh surface in the screen cylinder.

Fig. 2 in turn shows an axial section of a screen cylinder according to the invention, seen from one end of the screen cylinder. In fig. 2, the same numbers identify the same elements as in fig. 1. Fig. 2 shows a mesh wire 2 in a vertical direction, the mesh wire being attached to several supporting rods 3 that are one after the other in the vertical direction in the figure. The mesh wires 2 can be attached to the supporting rods 3 in different ways, such as by welding the mesh wires 2 to the supporting rods 3 or by attaching the mesh wires 2 to the supporting rods 3 by a clamp connection, which means that, for example, grooves are provided in the supporting rod 3 and one edge of each mesh wire 2 is positioned therein. The mesh wires 2 can be attached to the supporting rods 3 either mechanically by pressing or in some other way known per se.

The figure also shows a supporting ring 4, which is positioned outside the supporting rod 3 to surround the supporting rod 3. When a screen cylinder is produced, mesh wires 2 can first be attached to supporting rods 3 to provide a cylindrical structure, after which supporting rings 4 can be positioned around the supporting rods 3 and compressed such that they press the supporting rods 3 inwardly in the radial direction of the screen cylinder. The supporting rings 4 are arranged such that a broken supporting ring 4 is positioned around a supporting rod 3, after which the ends of the ring are pressed towards each other such that the ring becomes smaller in size and thereby presses the supporting rod inwards. After this, the ends of the supporting ring 4 are attached to each other by welding to provide a uniform supporting ring. After the welding, the means for tightening the ends of the ring are removed, and the point of welding is scraped to be clean and level, removing any irregularities and holes. It is not necessary to arrange supporting rings 4 at every supporting rod: it is possible to arrange one e.g. at every second or every third supporting rod. When the supporting ring 4 is pressed inwards in this way, the supporting rods 3 are subjected to a compression load, which reduces the load of the supporting rods when the screen cylinder is in use. The supporting ring 4 is advantageously bevelled at the edges in the manner shown in the figure, and it is provided with a groove such that the supporting rod 3 is received by the groove of the supporting ring 4. Advantageously, the edges are bevelled such that the bevel extends from the edge of the groove towards the outer perimeter of the supporting ring. The supporting ring 4 is not attached to the supporting rod 3 in any way, but in principle the supporting ring 4 is able to slide around the supporting rod 3. In practice, the supporting ring 4 and the supporting rod 3, however, hardly move in relation to one another because of the compression force between them.

Both ends of the screen cylinder are also provided with flanges 5, which are attached to the mesh wires 2 at their ends by a weld 6, and to the nearest supporting

rod 3 by a weld 7 between them. The flanges 5 can also be attached in some other manner known per se, but in this embodiment this is the simplest solution.

The screen cylinder of the invention can also be implemented in another manner: the mesh wires 2 are arranged inside the rings formed by the supporting rods 3 such that they are held in position, but not attached to, the grooves 3a of the supporting rods 3. When the supporting rods 3 are then pressed inwards with the supporting rings 4, a compression force is generated in the supporting rods, and the force presses the mesh wires 2 against the supporting rods 3 without their being attached to them in any other way.

An advantage of the screen cylinder of the invention is that the forces generated in it during the use are distributed more evenly than in known solutions. Because of this, the forces and stresses caused by variation in pressure do not essentially strain the connection between the mesh wire and the supporting rod, since the supporting rings receive most of the load, and so the supporting rods are not able to expand in the radial direction as much as in known solutions.

Fig. 3 shows a schematic view of one embodiment for shaping the mesh wires and the supporting rod such that the mesh wires are in as close contact with the supporting rod as possible. As shown in the figure, the cross-section of the mesh wires comprises a flat attaching part 2a, which easily fits into grooves 3a provided in the supporting rod 3. The mesh wires 2 are placed in the grooves of the ring-shaped supporting rod 3. When the supporting rod is then compressed in the radial direction with the supporting ring in the manner described above, the mesh wires are pressed against the supporting rod, and if desired, the supporting rod can be pressed with the supporting ring such that the entire wire is subjected to compression force.

The invention has been described above in the specification and the drawing by way of example, and it is not in any way restricted to the above. The invention can thus be modified freely within the scope of the claims. The mesh wires can be attached to the supporting rod either by welding, by a clamp connection, or in a manner known per se. Supporting rings can be provided either at every supporting rod, or at suitable intervals e.g. at every second or every third supporting rod. Also, the mesh wires can first be placed in the grooves of the supporting rods, after which the supporting rod is bent to form a ring such that the mesh wires are pressed in place to some extent. If the clamp connection between the supporting rods and mesh wires is pressed with the supporting ring, the connection becomes even tighter.

55 Claims

1. A method of making a screen cylinder, in which method mesh wires (2) are arranged next to one

another at predetermined intervals and attached in the axial direction of the screen cylinder to provide a cylindrical mesh surface on the inside of ring-shaped supporting rods (3), and at least some of the supporting rods (3) are surrounded on the outside with supporting rings (4) that support them, **characterized** in that the supporting rings (4) are positioned around the corresponding supporting rods (3) without fastening the supporting ring (4) to the supporting rod (3), and that the supporting ring (4), when it is put in place, is tightened around the supporting rod (3) so firmly that it presses the supporting rod (3) in the radial direction of the screen cylinder.

2. A screen cylinder for purifying and sorting out a pulp mixture, the screen cylinder comprising mesh wires (2) arranged in the axial direction of the screen cylinder at predetermined intervals to provide a cylindrical mesh surface, the mesh wires being attached to the surrounding supporting rods (3), and at least some of the supporting rods (3) being surrounded on the outside by a supporting ring (4), **characterized** in that the supporting ring (4) is positioned around the corresponding supporting rod (3) without fastening it to the supporting rod (3), and that the supporting ring (4), when it is put in place, is tightened around the supporting rod (3) so firmly that it presses the supporting rod (3) in the radial direction of the screen cylinder.
3. A screen cylinder according to claim 2, **characterized** in that the mesh wires (2) are placed in grooves (3a) formed in the supporting rod (3) without attaching them to the supporting rod in any other way, and that the supporting ring (4), when positioned around the supporting rod (3), is tightened so much that the supporting rods (3) press inwardly in the radial direction, pressing the mesh wires (2) tightly between the edges of the grooves (3a) in the supporting rod.
4. A screen cylinder according to claim 2 or 3, **characterized** in that the supporting ring (4) has on the inside a groove that is of the same width as the supporting rod (3), and that the supporting ring (4) is positioned around the supporting rod (3) such that the supporting rod (3) is in said groove.
5. A screen cylinder according to claim 4, **characterized** in that the inner edge of the supporting ring (4) is bevelled such that the bevelled surface extends essentially from the edge of said groove towards the outer edge of the supporting ring (4).

Patentansprüche

1. Verfahren zur Herstellung eines Siebzyllinders, bei

dem Maschendrahte (2) nebeneinander in vorbestimmten Intervallen angeordnet und in axialer Richtung des Siebzyllinders angebracht werden, um eine zylindrische Maschenfläche an der Innenseite von ringförmigen Stützstäben (3) bereitzustellen, und bei dem wenigstens einige der Stützstäbe (3) an der Außenseite mit diesen stützenden Stützringen (4) umgeben werden, dadurch gekennzeichnet, daß die Stützringe (4) um die entsprechenden Stützstäbe (3) herum angeordnet werden, ohne den Stützring (4) an dem Stützstab (3) zu befestigen, und daß der Stützring (4), wenn dieser am vorgesehenen Ort angebracht wird, so fest um den Stützstab (3) herumgelegt wird, daß er den Stützstab (3) in die radiale Richtung des Siebzyllinders drückt.

2. Siebzyllinder zum Reinigen und Aussortieren einer Brei- oder Pulpemischung, wobei der Siebzyllinder Maschendrahte (2) umfaßt, die in axialer Richtung des Siebzyllinders in vorbestimmten Intervallen angeordnet sind, um eine zylindrische Maschenfläche bereitzustellen, wobei die Maschendrahte an den sie umgebenden Stützstäben (3) angebracht sind, und wobei wenigstens einige der Stützstäbe (3) an der Außenseite von einem Stützring (4) umgeben sind, dadurch gekennzeichnet, daß der Stützring (4) um den entsprechenden Stützstab (3) herum angeordnet ist, ohne an dem Stützstab (3) befestigt zu sein, und daß der Stützring (4), wenn er am vorgesehenen Ort angeordnet ist, so fest um den Stützstab (3) herumgelegt ist, daß er den Stützstab (3) in die radiale Richtung des Siebzyllinders drückt.
3. Siebzyllinder nach Anspruch 2, dadurch gekennzeichnet, daß die Maschendrahte (2) in Nuten (3a) angeordnet sind, die in dem Stützstab (3) ausgebildet sind, ohne daß die Maschendrahte (2) in irgendeiner anderen Weise an dem Stützstab angebracht sind, und daß der Stützring (4), wenn er um den Stützstab (3) herum angeordnet ist, so fest um diesen herumgelegt ist, daß die Stützstäbe (3) einen Druck nach Innen in radialer Richtung ausüben, wobei sie die Maschendrahte (2) zwischen den Kanten der Nuten (3a) im Stützstab festdrücken.
4. Siebzyllinder nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß der Stützring (4) auf der Innenseite eine Nut aufweist, welche die gleiche Weite hat wie der Stützstab (3), und daß der Stützring (4) um den Stützstab (3) herum so angeordnet ist, daß sich der Stützstab (3) in der Nut befindet.
5. Siebzyllinder nach Anspruch 4, dadurch gekennzeichnet, daß die Innenkante des Stützringes (4) so abgeschrägt ist, daß die abgeschrägte Fläche im wesentlichen von der Kante der Nut zur äußeren Kante des Stützringes (4) verläuft.

Revendications

1. Procédé de fabrication d'un cylindre formant tamis, dans lequel procédé des fils (2) formant un treillis sont agencés les uns à côté des autres à intervalles prédéterminés et attachés dans la direction axiale du cylindre formant tamis pour obtenir une surface de treillis cylindrique à l'intérieur de tiges de support (3) annulaires, et au moins quelques-unes des tiges de support (3) sont entourées sur l'extérieur, par des anneaux de support (4) les supportant, **caractérisé** en ce que les anneaux de support (4) sont placés autour des tiges de support correspondantes (3) sans fixer l'anneau de support (4) à la tige de support (3), et en ce que l'anneau de support (4), lorsqu'il est mis en place, est serré autour de la tige de support (3) si fortement qu'il pousse la tige de support (3) dans la direction radiale du cylindre formant tamis.
2. Cylindre formant tamis servant à purifier et trier un mélange de pulpes, le cylindre formant tamis comprenant des fils (2) formant un treillis agencés dans la direction axiale du cylindre formant tamis à intervalles prédéterminés pour obtenir une surface de treillis cylindrique, les fils métalliques du treillis étant attachés aux tiges de support périphériques (3), et au moins quelques-unes des tiges de support (3) étant entourées sur l'extérieur par un anneau de support (4), **caractérisé** en ce que l'anneau de support (4) est placé autour de la tige de support correspondante (3) sans le fixer à la tige de support (3), et en ce que l'anneau de support (4), lorsqu'il est mis en place, est serré autour de la tige de support (3) si fortement qu'il pousse la tige de support (3) dans la direction radiale du cylindre formant tamis.
3. Cylindre formant tamis selon la revendication 2, **caractérisé** en ce que les fils (2) formant un treillis sont placés dans des rainures (3a) formées dans la tige de support (3) sans les attacher à la tige de support d'une façon ou d'une autre, et en ce que l'anneau de support (4), lorsqu'il est placé autour de la tige de support (3), est tellement serré que les tiges de support (3) poussent vers l'intérieur dans la direction radiale, poussant les fils (2) de treillis fortement entre les bords des rainures (3a) formées dans la tige de support.
4. Cylindre formant tamis selon la revendication 2 ou 3, **caractérisé** en ce que l'anneau de support (4) comporte à l'intérieur une rainure qui est de la même largeur que la tige de support (3), et en ce que l'anneau de support (4) est placé autour de la tige de support (3), de telle sorte que la tige de support (3) se trouve dans ladite rainure.
5. Cylindre formant tamis selon la revendication 4, **caractérisé** en ce que le bord intérieur de l'anneau de support (4) est biseauté, de telle sorte que la surface biseautée s'étend essentiellement depuis le bord de la rainure en direction du bord extérieur de l'anneau de support (4).

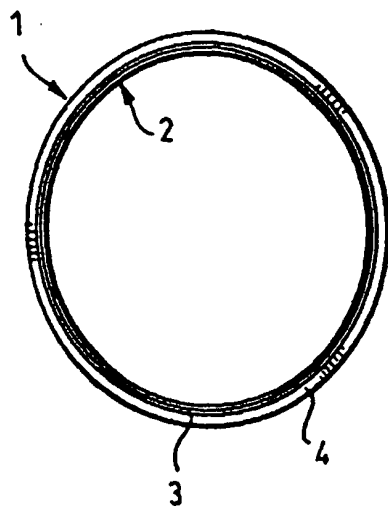


FIG. 1

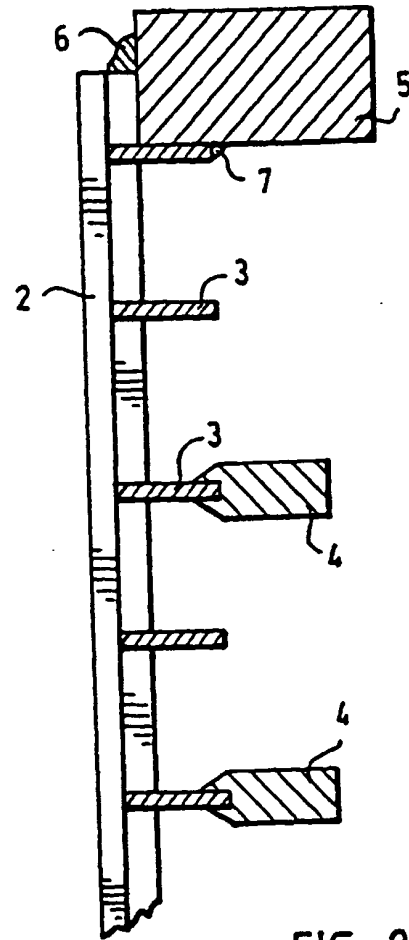


FIG. 2

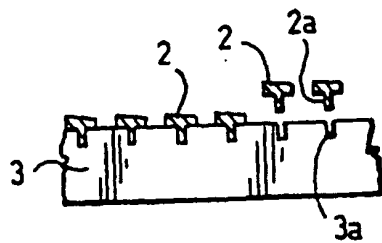


FIG. 3